

# EMC TEST REPORT

|                                                                                                                                                                                                                                                                                                          |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>Project No.</b>                                                                                                                                                                                                                                                                                       | LBE20133257                    | <b>Issue No.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0 |
| <b>Applicant</b>                                                                                                                                                                                                                                                                                         | <b>Name of organization</b>    | <b>Samsung Electronics Co., Ltd.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|                                                                                                                                                                                                                                                                                                          | <b>Address</b>                 | (Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 Korea                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |
|                                                                                                                                                                                                                                                                                                          | <b>Date of application</b>     | June 05, 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
| <b>EUT</b>                                                                                                                                                                                                                                                                                               | <b>Type of device</b>          | Class B personal computers and peripherals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|                                                                                                                                                                                                                                                                                                          | <b>Equipment authorization</b> | <input type="checkbox"/> Declaration of Conformity <input checked="" type="checkbox"/> Certification <input type="checkbox"/> Verification                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|                                                                                                                                                                                                                                                                                                          | <b>FCC ID</b>                  | A3LSLM4025NX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
|                                                                                                                                                                                                                                                                                                          | <b>Kind of product</b>         | Mono Laser Printer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|                                                                                                                                                                                                                                                                                                          | <b>Model No.</b>               | ProXpress M4020NX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|                                                                                                                                                                                                                                                                                                          | <b>Variant Model No.</b>       | ProXpress M4025NX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|                                                                                                                                                                                                                                                                                                          | <b>Manufacturer</b>            | 1) <b>Samsung Electronics (Shandong) Digital Printing Co., Ltd.</b><br>Samsung Road, Weihai Hi-Tech. IDZ, Weihai City, Shandong Province, China<br><br>2) <b>Weihai Xinxing Digital Electronics Co., Ltd.</b><br>98, Jinzhou Road, Weihai Hi-Tech Industries Development Zone<br><br>3) <b>Intops (Weihai) Electronics Company Ltd.</b><br>No.268-1, Keji Road, Weihai Hi-tech IDZ, Shandong Province, P.R.China<br><br>4) <b>Samsung Electronics Suzhou Computer Co., Ltd.</b><br>318 Fangzhou Road, Suzhou Industrial Park, Jiangsu Province, China |   |
| <b>Applied Standards</b>                                                                                                                                                                                                                                                                                 |                                | FCC Part 15, Subpart B / ANSI C63.4-2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |
| <b>Test Period</b>                                                                                                                                                                                                                                                                                       |                                | June 05, 2013 ~ June 24, 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
| <b>Issue date</b>                                                                                                                                                                                                                                                                                        |                                | July 17, 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
| <b>Test result : Complied</b><br><br>The equipment under test has found to be compliant with the applied standards.<br>The result is not applied the uncertainty concept.<br>This mean that the result is applied the original (standard) limit.<br>(Refer to the attached test result for more detail.) |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
| <b>Tested by</b> : Young-Man Lee<br><br>                                                                                                                                                                              |                                | <b>Reviewed by</b> : Tae Young Jang<br><br>                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
| The test results in this report only apply to the tested sample. This report must not be reproduced, except in full, without written permission from CS & Environment center.                                                                                                                            |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
| <br><br>(Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 Korea<br>Tel: 82 31 277 7752, Fax: 82 31 277 7753                                                                                  |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |

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# 1. Report information

## 1.1 Revision history

| No.     | Revised detailed information                                  |
|---------|---------------------------------------------------------------|
| Issue 0 | There are no revisions and this version is basic test report. |

## 1.2 Sample calculation

### 1.2.1 Conducted disturbance (at 10 MHz)

- Class B limit = 60 dB $\mu$ V (Quasi-peak limit)
- Level (50 dB $\mu$ V) = Meter Reading (40.2 dB $\mu$ V) + factor ( 9.8 dB, AMN factor 9.7 dB + Cable loss 0.1 dB)
- Margin (10 dB) = Limit (60 dB $\mu$ V) – Level (50 dB $\mu$ V) = 10 dB below limit

### 1.2.2 Radiated disturbance (at 100 MHz)

- Class B limit = 30 dB $\mu$ V/m at 10 m
- Level (20 dB $\mu$ V/m)  
= Meter Reading (40 dB $\mu$ V) + factor (- 20 dB (1/m), antenna factor + cable loss – amplifier gain)
- Margin (10 dB) = Limit (30 dB $\mu$ V/m) – Level (20 dB $\mu$ V/m) = 10 dB below limit

# 2. Summary of test results

## 2.1 Emission

The EUT has been tested according to the following specifications:

| Applied                             | Test type                             | Applied standard                                           | Result   |
|-------------------------------------|---------------------------------------|------------------------------------------------------------|----------|
| <input checked="" type="checkbox"/> | Conducted Disturbance<br>(Mains Port) | FCC Part 15<br>Subpart B<br>/ ANSI C63.4-2009<br>(Class B) | Complied |
| <input checked="" type="checkbox"/> | Radiated Disturbance                  |                                                            | Complied |

### 3. General Information

#### 3.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at (Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 Korea. All testing is performed in Semi-anechoic chambers conforming to the site attenuation Characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

The CS & Environment center is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

### 4. Test Setup configuration

#### 4.1 Test configuration

##### 4.1.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.

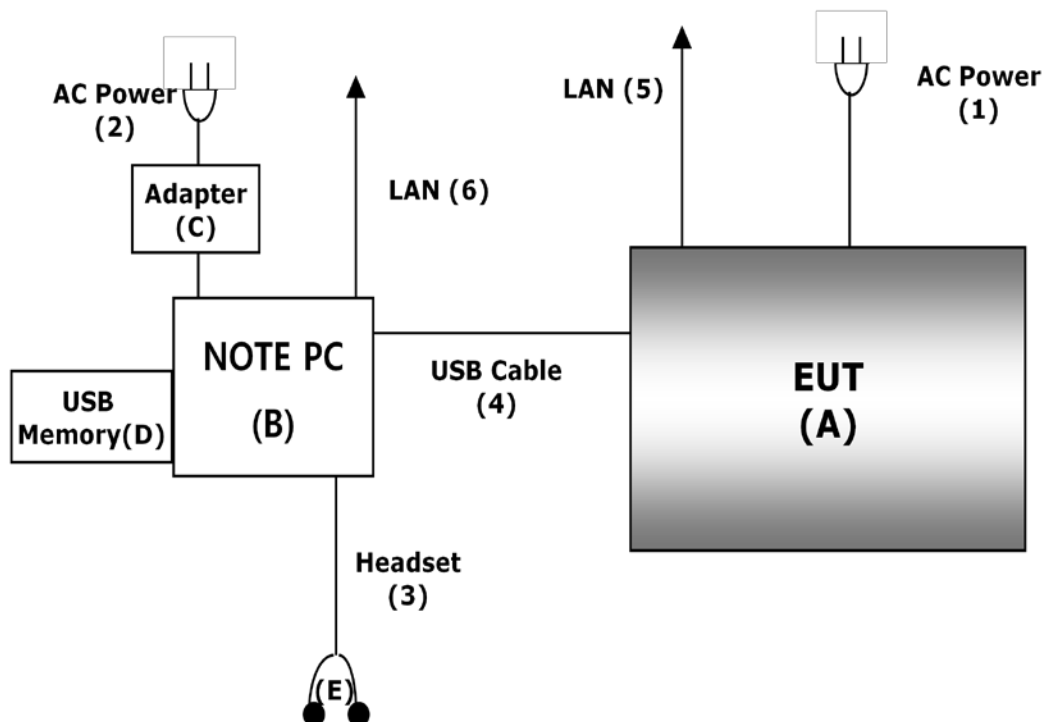
The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

| Seq | Description    | Model No.         | Serial No.              | Manufacturer | Fcc ID / DoC |
|-----|----------------|-------------------|-------------------------|--------------|--------------|
| A   | MONO LASER MFP | ProXpress M4020NX | -                       | Samsung      | A3LSLM4025NX |
| B   | Note PC        | P10               | D51491FW30032           | SAMSUNG      | DoC          |
| C   | Adapter        | AD-6019R          | CNBA4400242ADON81CN0H8G | DELL         | -            |
| D   | USB Memory     | Cruzer 4GB        | -                       | Sandisk      | DoC          |
| E   | Headset        | COV903            | -                       | COSY         | DoC          |

### 4.1.2 Test cables

| No. | Connected cable | Length [m] | Shielded [Y/N] | Note               |
|-----|-----------------|------------|----------------|--------------------|
| 1   | Power           | 1.0        | No             | For EUT            |
| 2   | Power           | 1.8        | No             | For PC             |
| 3   | USB             | 1.8        | Yes            | From EUT to PC     |
| 4   | Audio           | 1.8        | No             | From PC to Headset |
| 5   | LAN             | 2.0        | No             | From EUT to HUB    |
| 6   | LAN             | 2.0        | No             | From PC to HUB     |

### 4.1.3 Test arrangement



## 4.2 EUT operating mode

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

|                         |                |
|-------------------------|----------------|
| <b>Operating Mode 1</b> | Standby        |
| <b>Operating Mode 2</b> | P2USB Printing |

## 4.3 Details of Sampling

Customer selected, single unit.

## 4.4 Clock Frequencies

| Kind of Clocks | Frequency[MHz] | Kind of Clocks | Frequency[MHz] |
|----------------|----------------|----------------|----------------|
| Main Source    | 12             | Video          | 23.689         |
| CPU Internal   | 1 000          | DDR3           | 660            |
| USB device     | 12             | ETHERNET       | 25             |

## 4.5 EUT Description

The following features describe EUT represented by this report:

| Item                   | Specification and Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Processor              | Chorus4N (1GHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Standard System memory | 1GB DDR3 on all configurations (default)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Resolution             | Pseudo 1200 dpi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Speed                  | Xpress M402*** series 40ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Paper Handling         | Paper Tray(standard) 250 Sheets<br>SCF Tray(option) 520 Sheets<br>MP Tray 1 Sheet (M33**ND, M38**D series)<br>MP Tray 50 Sheets (M38**ND, M38**DW, M40**ND series)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Power Rating           | 120VAC , 3. 5A, 5 0/60 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Power Consumption      | Power save mode : 3.5 Watts<br>Stand by mode : 50 Watts<br>Printing simplex : 700 Watts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Printer Language       | SPL,PCL6,PS3,PCL5e, IBM Proprint, EPSON, KS, KSSM, PDF V1.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Interfaces             | USB2.0, Ethernet 10/100/1000 Base TX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| OS compatibility       | Window XP (32/64 bit) / 2003 Server (32/64 bit) / Vista (32/64 bit) / 2008 server (32/64 bit) / 7 (32/64 bit) / 2008 Server R2 / 8 (32/64bit)<br>Linux : RedHat Enterprise Linux WS 4, 5, 6 (32/64 bit) / Fedora 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 (32/64 bit) / OpenSuSE 10.2, 10.3, 11.0, 11.1, 11.2, 11.3, 11.4 (32/64 bit) / Mandriva 2007, 2008, 2009, 2009.1, 2010 (32/64 bit) / Ubuntu 6.06, 6.10, 7.04, 7.10, 8.04, 8.10, 9.04, 9.10, 10.04, 10.10, 11.04 (32/64 bit) / SuSE Linux Enterprise Desktop 10, 11 (32/64 bit) / Debian 4.0, 5.0, 6.0 (32/64 bit)<br>UNIX : Sun Solaris 9,10,11 (x86, SPARC) / HP-UX 11.0, 11i v1, 11i v2, 11i v3 (PA-RISC, Itanium) / IBM AIX 5.1, 5.2, 5.3, 5.4, 6.1, .7.1 (PowerPC)<br>Mac OS : X10.5~10.8<br>Citrix Presentation Server<br>Windows Terminal Services |
| Modes of Operation     | USB Printing, Network Printing , WI-FI Printing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## 4.6 Test configuration and condition

The system was configured for testing in typical fashion use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. The mode of operation utilized for testing was selected to best simulate typical EUT use. Power source for the EUT operating was supplied by CVCF made by the Pacific Corp.

Three different types of SMPS, SHANDONG NEW COWITEL, Dong yang were applied during testing. Each SMPS was installed for testing, tested and reported.

- Configuration 1 : Dong yang SMPS was applied.
- Configuration 2 : LITEON SMPS was applied.

**- Test Voltage : AC 120 V, 60 Hz**

| Item       | Model Name    | P/N         | Manufacturer  |
|------------|---------------|-------------|---------------|
| Main Board | Falcon        | JC92-02620A | PIOTEK,BTI    |
| SMPS       | PSPN-TYPE2-V1 | JC44-00095D | DONG YANG E&P |
|            | PSPN-TYPE2-V1 | JC44-00095D | LITEON        |
| HVPS       | MAGPIE        | JC44-00197A | DONG YANG E&P |
|            | MAGPIE        | JC44-00197A | WEISUN        |

## 4.7 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

### 4.7.1 Emission

| Test type                             |               | Measurement uncertainty<br>(C.L. 95 %, k = 2) |
|---------------------------------------|---------------|-----------------------------------------------|
| Conducted disturbance                 | Main terminal | 3.23 dB                                       |
| Radiated Disturbance<br>(Below 1 GHz) | Horizontal    | 3.98 dB                                       |
|                                       | Vertical      | 4.70 dB                                       |
| Radiated Disturbance<br>(Above 1 GHz) | Horizontal    | 3.46 dB                                       |
|                                       | Vertical      | 3.51 dB                                       |

## 5. Results of individual test

### 5.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in standards.

#### Limits for conducted disturbance at the mains ports of class B ITE

| Frequency range Limits<br>MHz                                                                              | Resolution Bandwidth | Limits dB $\mu$ V |          |
|------------------------------------------------------------------------------------------------------------|----------------------|-------------------|----------|
|                                                                                                            |                      | Quasi-peak        | Average  |
| 0.15 to 0.50                                                                                               | 9 kHz                | 66 to 56          | 56 to 46 |
| 0.50 to 5                                                                                                  | 9 kHz                | 56                | 46       |
| 5 to 30                                                                                                    | 9 kHz                | 60                | 50       |
| NOTE 1 The lower limit shall apply at the transition frequency                                             |                      |                   |          |
| NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. |                      |                   |          |

#### 5.1.1 Test instrumentation

| Test instrumentation | Model name | Manufacturer | Serial or<br>Firmware<br>(No./Ver.) | Calibration |                     |
|----------------------|------------|--------------|-------------------------------------|-------------|---------------------|
|                      |            |              |                                     | Date        | Interval<br>(Month) |
| Test Receiver        | ESIB26     | R&S          | 100287                              | 2013-05-06  | 12                  |
| Two-Line V-Network   | ENV216     | R&S          | 100116                              | 2012-10-31  | 12                  |
| Two-Line V-Network   | ESH3-Z5    | R&S          | 100262                              | 2012-09-26  | 12                  |
| Test Software        | EMC32      | R&S          | Ver 5.20.2                          | -           | -                   |

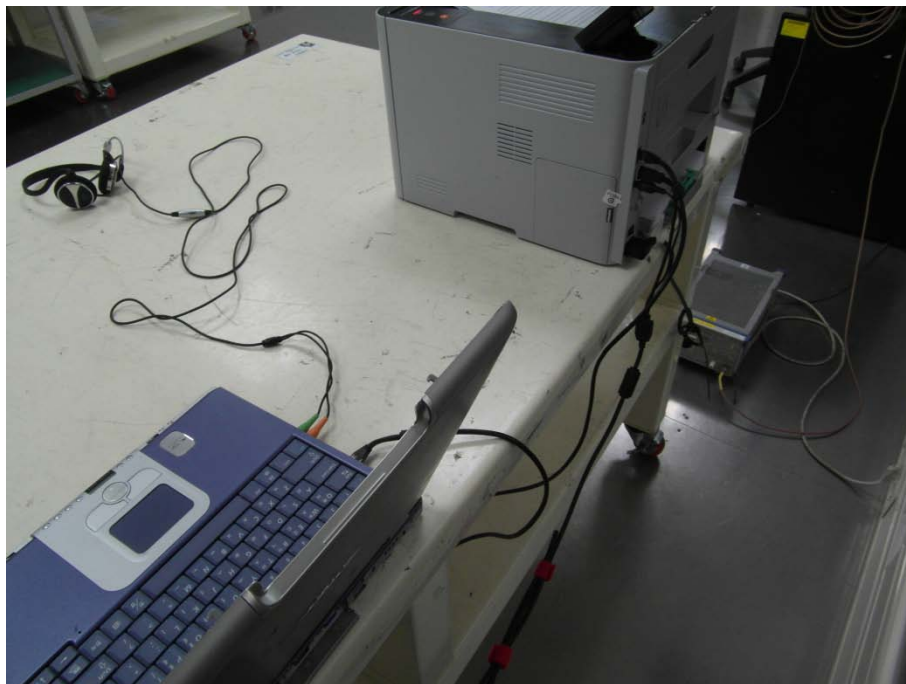
#### 5.1.2 Temperature and humidity condition

|                   |                      |               |                   |               |      |
|-------------------|----------------------|---------------|-------------------|---------------|------|
| Test date         | June 24, 2013        | Test engineer |                   | Young-Man Lee |      |
| Climate condition | Ambient temperature  | 24.5 °C       | Relative humidity |               | 23 % |
|                   | Atmospheric pressure | 101.2 kPa     |                   |               |      |
| Test place        | Shielded Room #1     |               |                   |               |      |

### 5.1.3 Photograph of Test Setup



**Front**



**Rear**

## 5.1.4 Test results (mains port)

- Configuration 1 : Standby

### Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

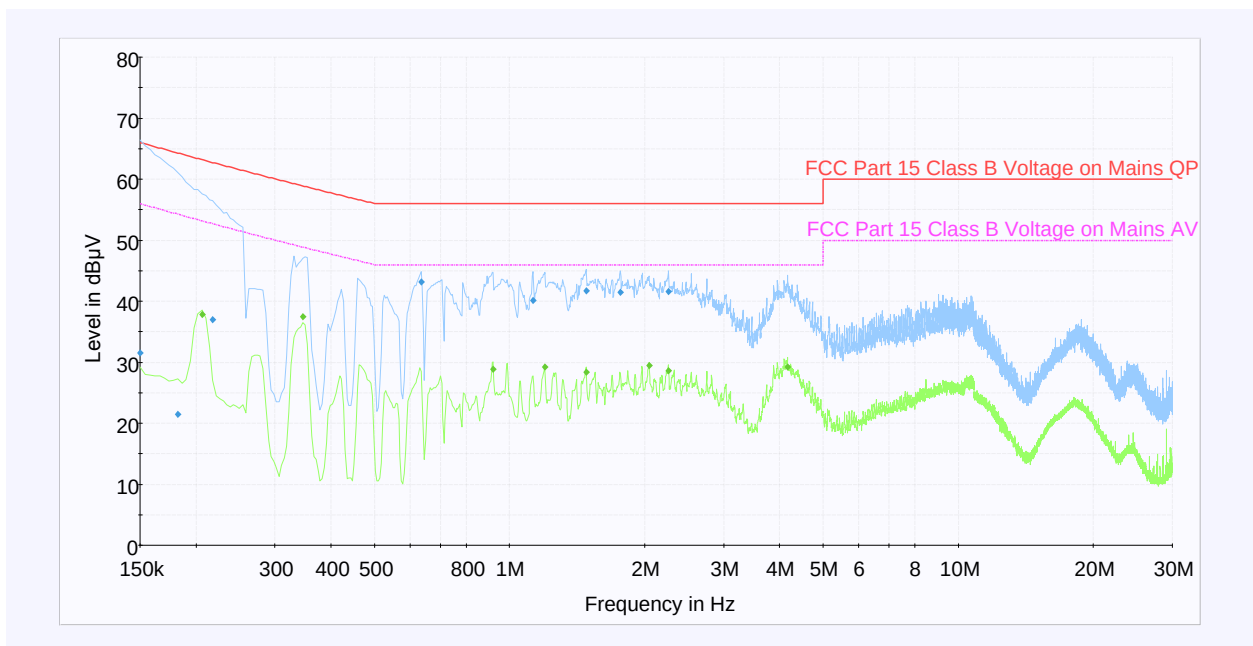
Frequency Range: 150 kHz – 30 MHz  
 Receiver: ESIB 26  
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

### Scan Setup: EN55022\_B\_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN  
 Level Unit: dB  $\mu$  V

| Subrange         | Detectors           | IF Bandwidth | Meas. Time | Receiver |
|------------------|---------------------|--------------|------------|----------|
| 150 kHz – 30 MHz | Quasi Peak; Average | 9 kHz        | 15 s       | ESIB 26  |

### Test Graph



Note) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

## Test Results ( Quasi-Peak and Average)

Quasi-peak final measurement results table

| Frequency (MHz) | Quasi-Peak (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|-------------------------|------|-------------|-------------|--------------------|
| 0.150           | 31.5                    | N    | 10.4        | 34.5        | 66.0               |
| 0.182           | 21.5                    | N    | 10.1        | 42.8        | 64.3               |
| 0.218           | 36.9                    | N    | 10.0        | 25.8        | 62.7               |
| 0.634           | 43.2                    | N    | 10.1        | 12.8        | 56.0               |
| 1.128           | 40.1                    | N    | 9.9         | 15.9        | 56.0               |
| 1.480           | 41.6                    | N    | 9.9         | 14.4        | 56.0               |
| 1.764           | 41.4                    | L1   | 9.9         | 14.6        | 56.0               |
| 2.260           | 41.6                    | N    | 9.8         | 14.4        | 56.0               |

Average final measurement results table

| Frequency (MHz) | Average (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|------|-------------|-------------|--------------------|
| 0.206           | 37.9                 | L1   | 10.0        | 15.3        | 53.2               |
| 0.346           | 37.5                 | L1   | 10.0        | 11.4        | 48.9               |
| 0.918           | 28.8                 | N    | 10.0        | 17.2        | 46.0               |
| 1.196           | 29.2                 | L1   | 9.9         | 16.8        | 46.0               |
| 1.480           | 28.4                 | N    | 9.9         | 17.6        | 46.0               |
| 2.044           | 29.5                 | L1   | 9.8         | 16.5        | 46.0               |
| 2.256           | 28.6                 | N    | 9.8         | 17.4        | 46.0               |
| 4.164           | 29.2                 | N    | 9.8         | 16.8        | 46.0               |

Note) Level (Quasi-Peak and/or Average) = Meter Reading (Quasi-Peak and/or Average) +  
Factor (LISN Insertion Loss + Cable Loss)

Margin = Limit – Level (Quasi-Peak and/or Average)

- Configuration 1 : P2USB Printing

## Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

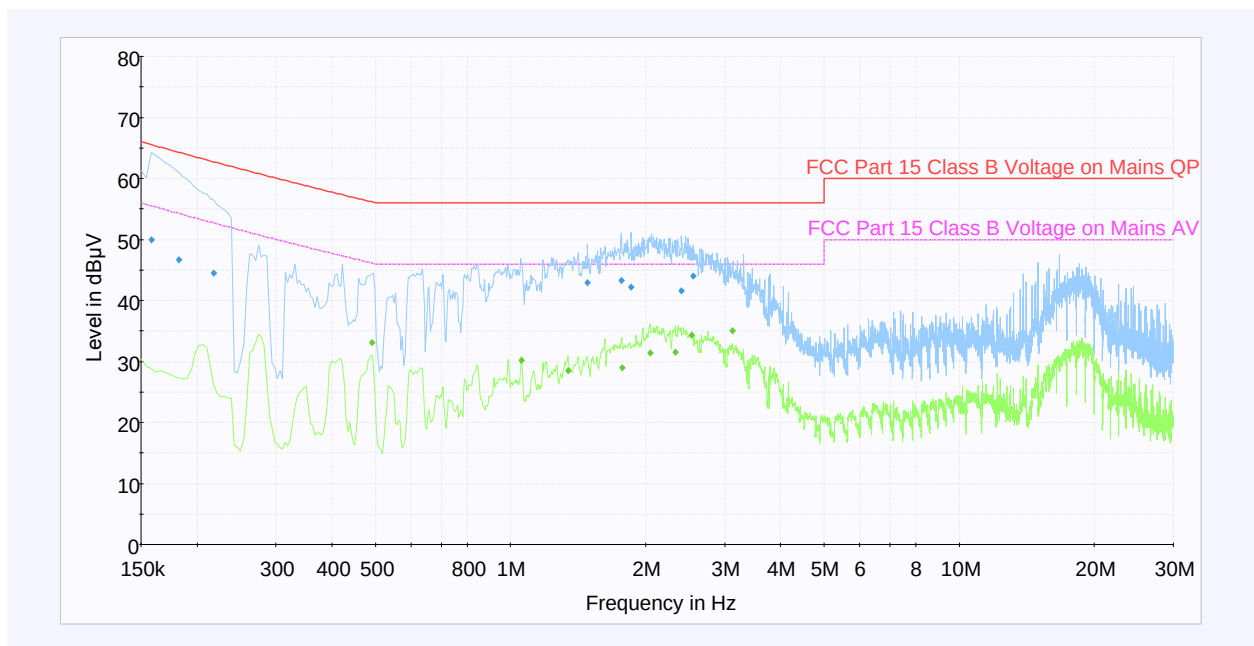
Frequency Range: 150 kHz – 30 MHz  
Receiver: ESIB 26  
Transducer: ENV216 / Receiver-2-Line-LISN ENV216

## Scan Setup: EN55022\_B\_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN  
Level Unit: dB  $\mu$  V

| Subrange         | Detectors           | IF Bandwidth | Meas. Time | Receiver |
|------------------|---------------------|--------------|------------|----------|
| 150 kHz – 30 MHz | Quasi Peak; Average | 9 kHz        | 15 s       | ESIB 26  |

### Test Graph



Note) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

**Test Results ( Quasi-Peak and Average)**

Quasi-peak final measurement results table

| Frequency (MHz) | Quasi-Peak (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|-------------------------|------|-------------|-------------|--------------------|
| 0.158           | 50.0                    | N    | 10.1        | 15.5        | 65.5               |
| 0.182           | 46.7                    | N    | 10.1        | 17.6        | 64.3               |
| 0.218           | 44.5                    | N    | 10.0        | 18.2        | 62.7               |
| 1.484           | 42.9                    | N    | 9.9         | 13.1        | 56.0               |
| 1.764           | 43.2                    | L1   | 9.9         | 12.8        | 56.0               |
| 1.856           | 42.1                    | L1   | 9.8         | 13.9        | 56.0               |
| 2.400           | 41.6                    | L1   | 9.9         | 14.4        | 56.0               |
| 2.548           | 44.0                    | L1   | 9.9         | 12.0        | 56.0               |

Average final measurement results table

| Frequency (MHz) | Average (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|------|-------------|-------------|--------------------|
| 0.490           | 33.1                 | N    | 10.1        | 13.1        | 46.2               |
| 1.056           | 30.2                 | L1   | 9.9         | 15.8        | 46.0               |
| 1.340           | 28.5                 | L1   | 9.9         | 17.5        | 46.0               |
| 1.768           | 29.0                 | L1   | 9.9         | 17.0        | 46.0               |
| 2.044           | 31.4                 | L1   | 9.8         | 14.6        | 46.0               |
| 2.328           | 31.5                 | L1   | 9.8         | 14.5        | 46.0               |
| 2.532           | 34.4                 | L1   | 9.9         | 11.6        | 46.0               |
| 3.120           | 35.1                 | N    | 9.8         | 10.9        | 46.0               |

Note) Level (Quasi-Peak and/or Average) = Meter Reading (Quasi-Peak and/or Average) +  
Factor (LISN Insertion Loss + Cable Loss)

Margin = Limit – Level (Quasi-Peak and/or Average)

- Configuration 2 : Standby

## Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

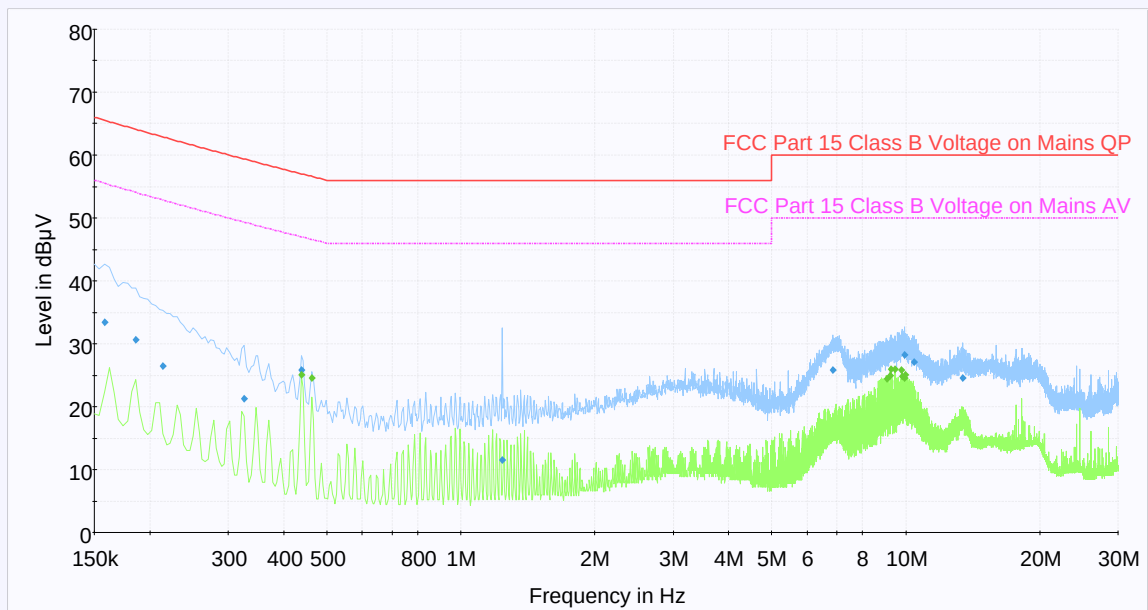
Frequency Range: 150 kHz – 30 MHz  
Receiver: ESIB 26  
Transducer: ENV216 / Receiver-2-Line-LISN ENV216

## Scan Setup: EN55022\_B\_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN  
Level Unit: dB  $\mu$  V

| Subrange         | Detectors           | IF Bandwidth | Meas. Time | Receiver |
|------------------|---------------------|--------------|------------|----------|
| 150 kHz – 30 MHz | Quasi Peak; Average | 9 kHz        | 15 s       | ESIB 26  |

### Test Graph



Note) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

## Test Results ( Quasi-Peak and Average)

Quasi-peak final measurement results table

| Frequency (MHz) | Quasi-Peak (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|-------------------------|------|-------------|-------------|--------------------|
| 0.158           | 33.4                    | N    | 10.1        | 32.1        | 65.5               |
| 0.186           | 30.6                    | L1   | 10.1        | 33.5        | 64.1               |
| 0.214           | 26.5                    | N    | 9.9         | 36.4        | 62.9               |
| 0.326           | 21.3                    | L1   | 10.0        | 38.1        | 59.4               |
| 0.438           | 25.8                    | L1   | 10.1        | 31.2        | 57.0               |
| 1.240           | 11.6                    | L1   | 9.9         | 44.4        | 56.0               |
| 6.844           | 25.9                    | N    | 9.9         | 34.1        | 60.0               |
| 9.944           | 28.2                    | N    | 10.0        | 31.8        | 60.0               |
| 10.456          | 27.0                    | N    | 10.0        | 33.0        | 60.0               |
| 13.416          | 24.6                    | N    | 10.1        | 35.4        | 60.0               |

Average final measurement results table

| Frequency (MHz) | Average (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|------|-------------|-------------|--------------------|
| 0.438           | 25.1                 | L1   | 10.1        | 21.9        | 47.0               |
| 0.462           | 24.5                 | L1   | 10.1        | 22.1        | 46.6               |
| 9.088           | 24.5                 | L1   | 9.9         | 25.5        | 50.0               |
| 9.228           | 25.0                 | L1   | 9.9         | 25.0        | 50.0               |
| 9.252           | 25.9                 | N    | 10.0        | 24.1        | 50.0               |
| 9.460           | 25.9                 | N    | 10.0        | 24.1        | 50.0               |
| 9.760           | 25.8                 | N    | 10.0        | 24.2        | 50.0               |
| 9.828           | 24.8                 | N    | 10.0        | 25.2        | 50.0               |
| 9.920           | 24.6                 | N    | 10.0        | 25.4        | 50.0               |
| 9.968           | 25.1                 | N    | 10.0        | 24.9        | 50.0               |

Note) Level (Quasi-Peak and/or Average) = Meter Reading (Quasi-Peak and/or Average) +  
Factor (LISN Insertion Loss + Cable Loss)

Margin = Limit – Level (Quasi-Peak and/or Average)

---

- Configuration 2 : P2USB Printing

## Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

Frequency Range: 150 kHz – 30 MHz

Receiver: ESIB 26

Transducer: ENV216 / Receiver-2-Line-LISN ENV216

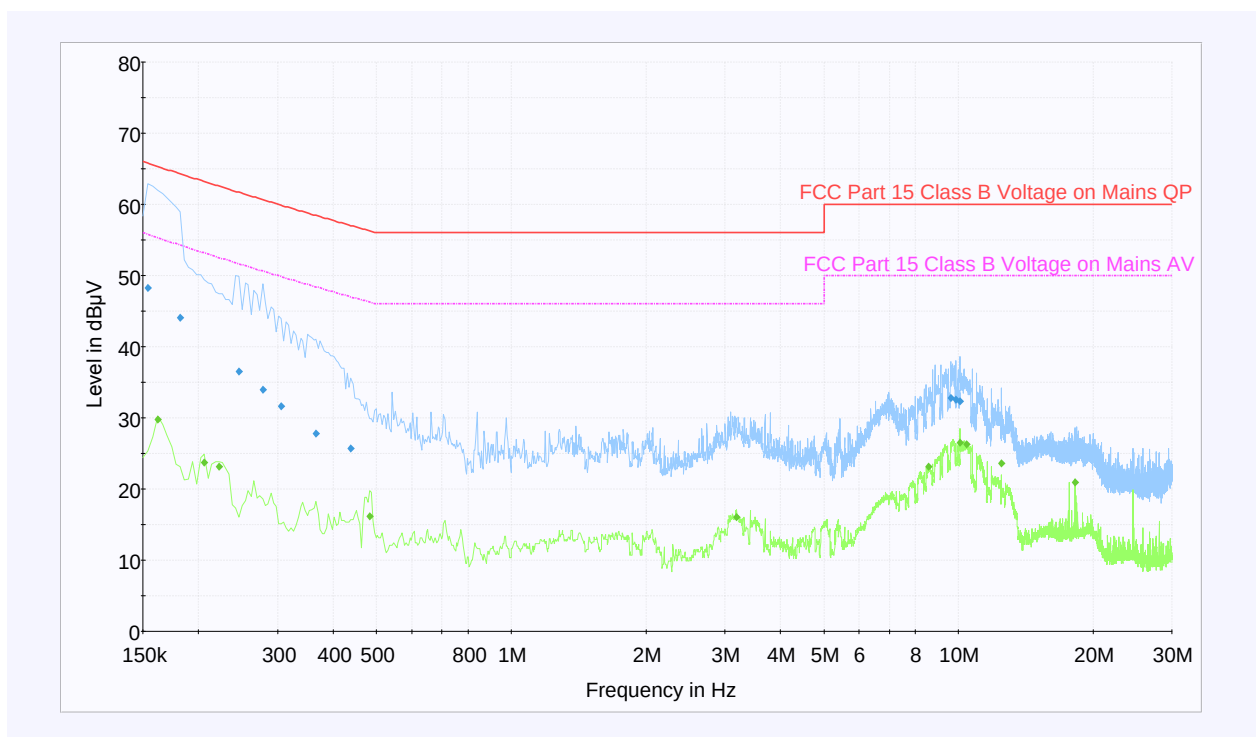
## Scan Setup: EN55022\_B\_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN

Level Unit: dB  $\mu$  V

| Subrange         | Detectors           | IF Bandwidth | Meas. Time | Receiver |
|------------------|---------------------|--------------|------------|----------|
| 150 kHz – 30 MHz | Quasi Peak; Average | 9 kHz        | 15 s       | ESIB 26  |

### Test Graph



Note) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

## Test Results ( Quasi-Peak and Average)

Quasi-peak final measurement results table

| Frequency (MHz) | Quasi-Peak (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|-------------------------|------|-------------|-------------|--------------------|
| 0.154           | 48.2                    | L1   | 10.0        | 17.6        | 65.8               |
| 0.182           | 44.0                    | L1   | 10.1        | 20.3        | 64.3               |
| 0.246           | 36.5                    | N    | 10.0        | 25.2        | 61.7               |
| 0.278           | 34.0                    | L1   | 10.0        | 26.7        | 60.7               |
| 0.306           | 31.7                    | L1   | 10.0        | 28.2        | 59.9               |
| 0.366           | 27.8                    | L1   | 10.0        | 30.6        | 58.4               |
| 0.438           | 25.7                    | L1   | 10.1        | 31.3        | 57.0               |
| 9.596           | 32.7                    | N    | 10.0        | 27.3        | 60.0               |
| 9.868           | 32.5                    | N    | 10.0        | 27.5        | 60.0               |
| 10.088          | 32.3                    | N    | 10.0        | 27.7        | 60.0               |

Average final measurement results table

| Frequency (MHz) | Average (dB $\mu$ V) | Line | Factor (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|------|-------------|-------------|--------------------|
| 0.162           | 29.8                 | N    | 10.1        | 25.5        | 55.3               |
| 0.206           | 23.7                 | N    | 9.9         | 29.5        | 53.2               |
| 0.222           | 23.2                 | N    | 10.0        | 29.3        | 52.5               |
| 0.482           | 16.1                 | L1   | 10.1        | 30.2        | 46.3               |
| 3.192           | 16.1                 | L1   | 9.8         | 29.9        | 46.0               |
| 8.556           | 23.2                 | N    | 9.9         | 26.8        | 50.0               |
| 10.088          | 26.5                 | N    | 10.0        | 23.5        | 50.0               |
| 10.412          | 26.3                 | N    | 10.0        | 23.7        | 50.0               |
| 12.488          | 23.6                 | N    | 10.1        | 26.4        | 50.0               |
| 18.244          | 20.9                 | L1   | 10.2        | 29.1        | 50.0               |

Note) Level (Quasi-Peak and/or Average) = Meter Reading (Quasi-Peak and/or Average) +  
Factor (LISN Insertion Loss + Cable Loss)

Margin = Limit – Level (Quasi-Peak and/or Average)

## 5.2 Radiated disturbance

Of those disturbances above ( $L - 20$  dB), where  $L$  is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin. All measurements were taken utilizing quasi-peak detection unless stated otherwise.

Measurements were performed at an antenna to EUT distance of 10 m and elevated between 1 m and 4 m.

Both vertical and horizontal antenna polarizations were measured.

### Limits for radiated disturbance of ITE at a measuring distance of 10 m

| Frequency range Limits<br>MHz                                                     | Resolution Bandwidth | Quasi-peak Limits dB $\mu$ V/m |
|-----------------------------------------------------------------------------------|----------------------|--------------------------------|
|                                                                                   |                      | Class B                        |
| 30 to 230                                                                         | 120 kHz              | 30                             |
| 230 to 1 000                                                                      | 120 kHz              | 37                             |
| NOTE 1 The lower limit shall apply at the transition frequency                    |                      |                                |
| NOTE 2 Additional provisions may be required for cases where interference occurs. |                      |                                |

Peak measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5<sup>th</sup> in accordance with internal maximum operating frequency at a measurement distance of 3 m for the following antenna and turntable arrangements:

| Antenna Height<br>( cm) | Antenna Polarisation | Turntable position<br>(degrees) |
|-------------------------|----------------------|---------------------------------|
| 100 ~ 400               | Horizontal, Vertical | Continuous                      |

Above 1 GHz, peak detector function mode is used with a resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz.

**Limits for above 1GHz radiated disturbance of ITE at a measuring distance of 3 m**

| Class                                                                      | Limits - dB(μV/m) |         |
|----------------------------------------------------------------------------|-------------------|---------|
|                                                                            | Peak              | Average |
| B                                                                          | 74                | 54      |
| Average limit 500, $20 \log 500 = 53.979 \text{ dB} \approx 54 \text{ dB}$ |                   |         |

Measurements within 20 dB of the limit were then maximized by adjusting turntable position. Final measurements were made using a average detector.

Results checked manually; and points close to the limit line were re-measured.

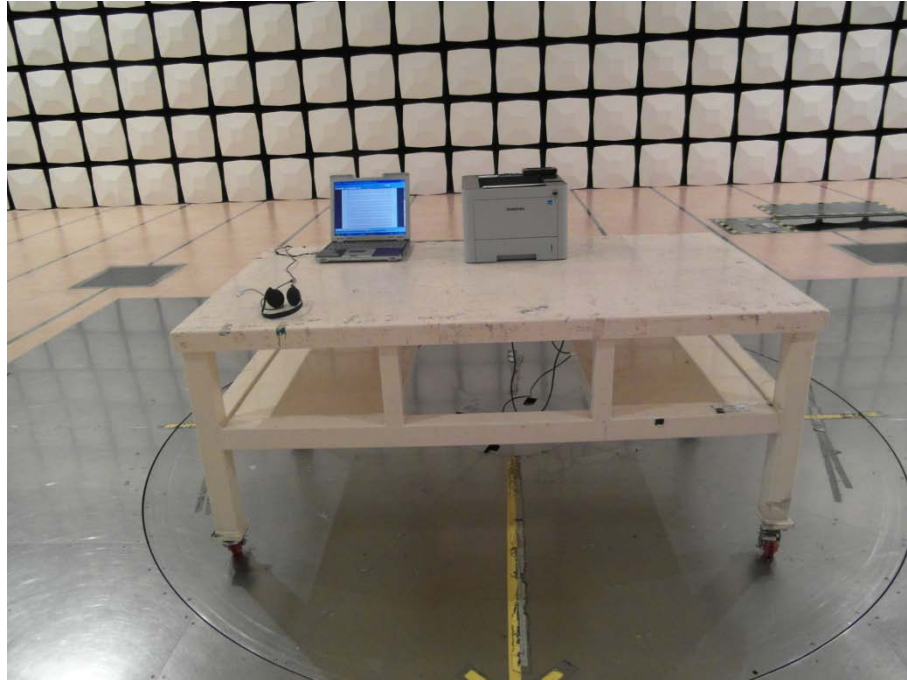
## 5.2.1 Test instrumentation

| Test instrumentation | Model name | Manufacturer | Serial or Firmware (No./Ver.) | Calibration |                  |
|----------------------|------------|--------------|-------------------------------|-------------|------------------|
|                      |            |              |                               | Date        | Interval (Month) |
| Bi-log Antenna       | CBL6112D   | Schaffner    | 22248                         | 2012-02-16  | 24               |
| Bi-log Antenna       | CBL6112D   | Schaffner    | 27627                         | 2011-10-11  | 24               |
| Horn Antenna         | HF907      | R&S          | 100016                        | 2013-02-28  | 24               |
| Test Receiver        | ESCI       | R&S          | 100086                        | 2012-11-27  | 12               |
| Test Receiver        | ESCI-03    | R&S          | 100136                        | 2013-05-06  | 12               |
| Test Receiver        | ESIB 26    | R&S          | 100147                        | 2013-04-13  | 12               |
| Amplifier            | 310N       | Sonoma       | 186467                        | 2012-11-01  | 12               |
| Amplifier            | 310N       | Sonoma       | 273121                        | 2012-11-14  | 12               |
| Preamplifier         | SCU_F018   | R&S          | 10049                         | 2012-10-04  | 12               |
| Antenna Mast         | MA4000     | INN CO       | -                             | -           | -                |
| Antenna Mast         | MA4000     | INN CO       | -                             | -           | -                |
| Antenna Mast         | MA2000     | INN CO       | -                             | -           | -                |
| Mast Controller      | CO2000     | INN CO       | -                             | -           | -                |
| Test software        | EP5/RE     | TOYO         | VER 5.3.70                    | -           | -                |
| RF Selector          | NS4900     | TOYO         | -                             | -           | -                |

## 5.2.2 Temperature and humidity condition

|                   |                               |               |                   |               |        |
|-------------------|-------------------------------|---------------|-------------------|---------------|--------|
| Test date         | June 05, 2013                 | Test engineer |                   | Young-Man Lee |        |
| Climate condition | Ambient temperature           | 25.5 °C       | Relative humidity |               | 43.6 % |
|                   | Atmospheric pressure          | 102.0 kPa     |                   |               |        |
| Test place        | 10 m #1 Semi-Anechoic Chamber |               |                   |               |        |

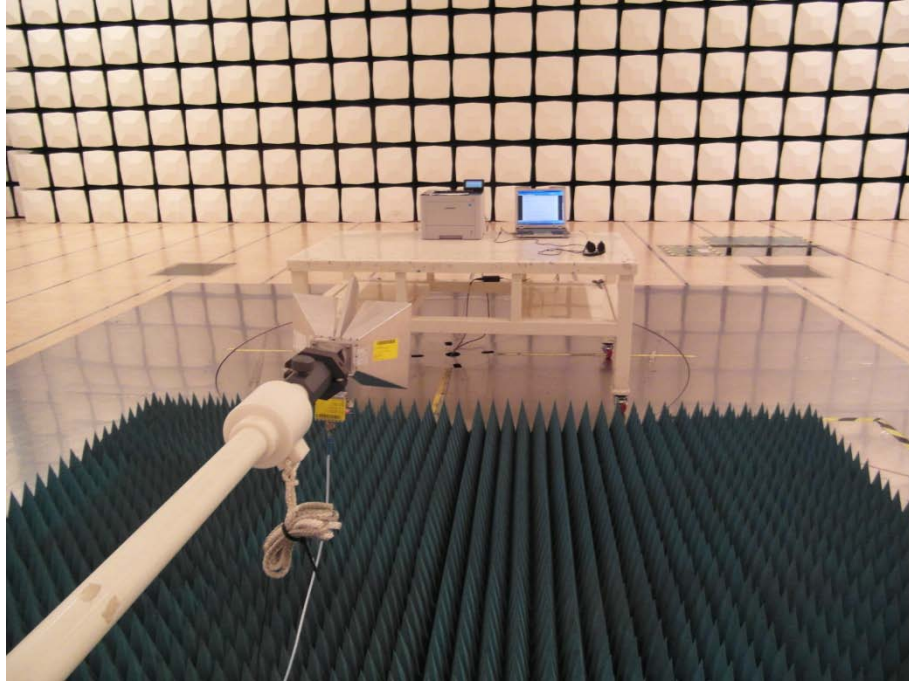
### 5.2.3 Photograph of Test Setup



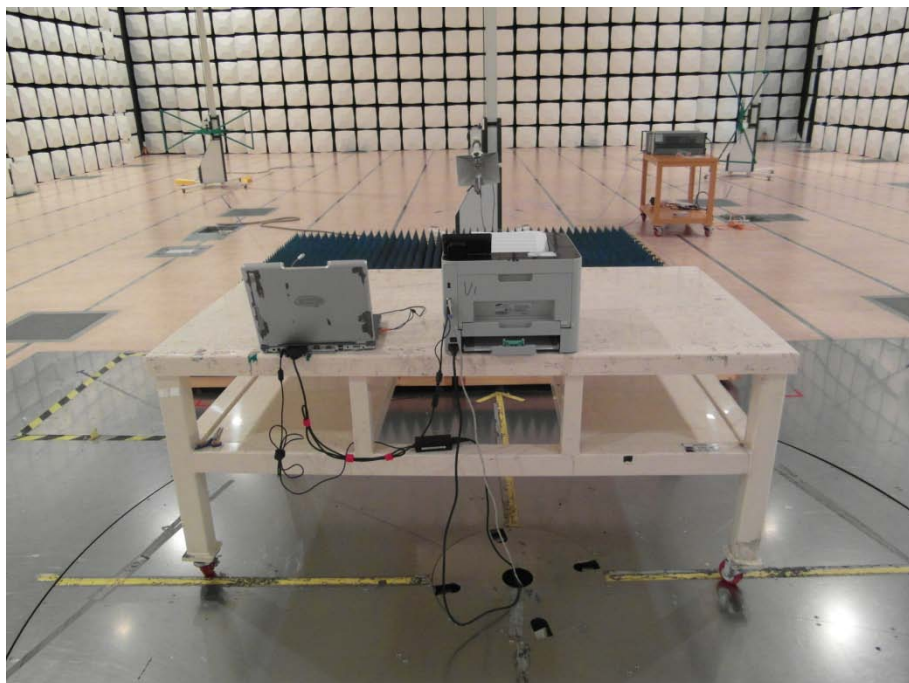
**Front (Below 1 GHz)**



**Rear (Below 1 GHz)**



**Front (above 1 GHz)**



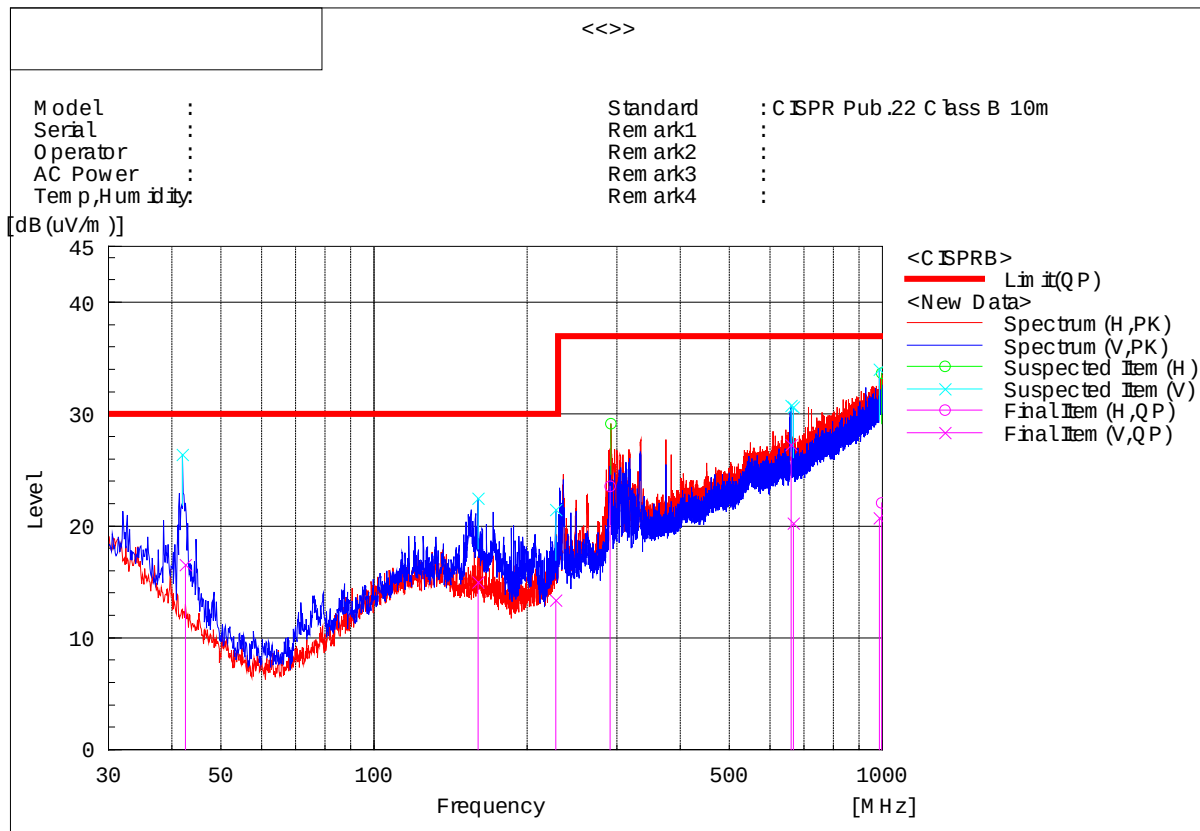
**Rear (above 1 GHz)**

## 5.2.4 Test results

### 5.2.4.1 30 MHz to 1 GHz test results

- Configuration 1 : Standby

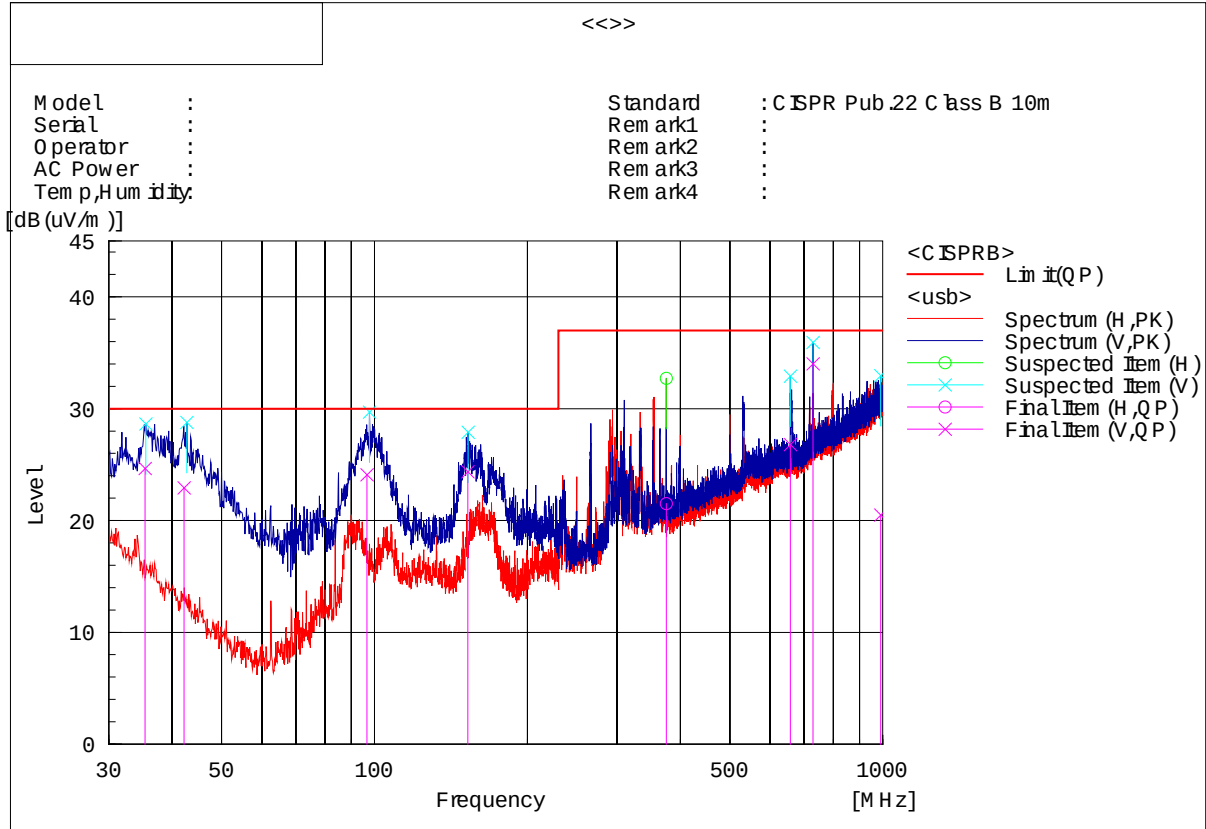
#### Test Graph and Results



| Frequency [MHz] | Pol. | Reading QP [dB(μV)] | Factor [dB(1/m)] | Level QP [dB(μV /m)] | Limit [dB(μV /m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|-----------------|------|---------------------|------------------|----------------------|-------------------|----------------|-------------|-------------|
| 42.512          | V    | 35.6                | -19.1            | 16.5                 | 30.0              | 13.5           | 104         | 281.6       |
| 159.859         | V    | 33.3                | -18.4            | 14.9                 | 30.0              | 15.1           | 199         | 355.8       |
| 227.516         | V    | 31.2                | -17.9            | 13.3                 | 30.0              | 16.7           | 100         | 182.3       |
| 291.672         | H    | 36.9                | -13.4            | 23.5                 | 37.0              | 13.5           | 321         | 249.2       |
| 661.713         | V    | 33.9                | -6.7             | 27.2                 | 37.0              | 9.8            | 200         | 69.4        |
| 668.866         | V    | 26.7                | -6.5             | 20.2                 | 37.0              | 16.8           | 200         | 177.5       |
| 987.147         | V    | 21.4                | -0.7             | 20.7                 | 37.0              | 16.3           | 100         | 102.5       |
| 996.484         | H    | 21.6                | 0.5              | 22.1                 | 37.0              | 14.9           | 400         | 2.0         |

- Configuration 1 : P2USB Printing

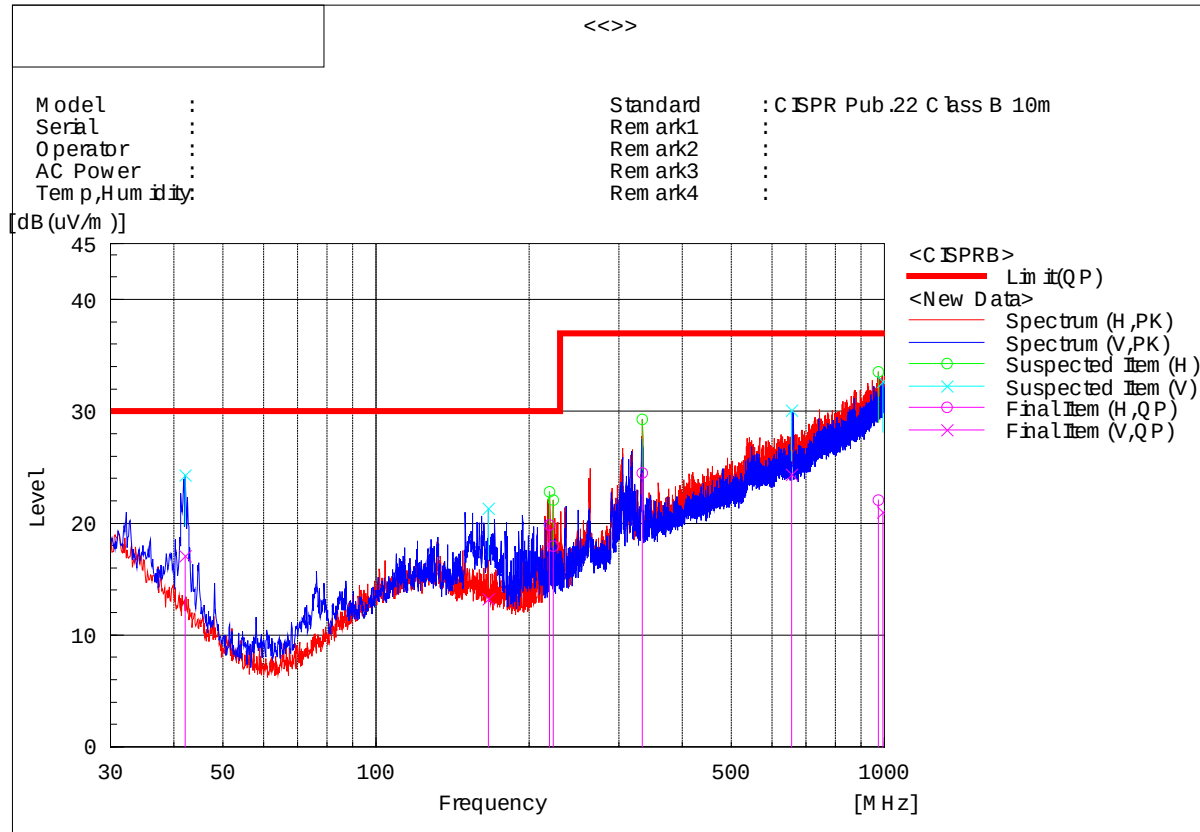
Test Graph and Results



| Frequency [MHz] | Pol. | Reading QP [dB(μV)] | Factor [dB(1/m)] | Level QP [dB(μV /m)] | Limit [dB(μV /m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|-----------------|------|---------------------|------------------|----------------------|-------------------|----------------|-------------|-------------|
| 35.339          | V    | 40.2                | -15.5            | 24.7                 | 30.0              | 5.3            | 111         | 29.0        |
| 42.172          | V    | 41.9                | -19.0            | 22.9                 | 30.0              | 7.1            | 100         | 1.2         |
| 96.602          | V    | 42.8                | -18.7            | 24.1                 | 30.0              | 5.9            | 137         | 0.3         |
| 152.698         | V    | 42.7                | -18.3            | 24.4                 | 30.0              | 5.6            | 105         | 285.4       |
| 374.956         | H    | 33.9                | -12.4            | 21.5                 | 37.0              | 15.5           | 200         | 91.8        |
| 658.075         | V    | 33.2                | -6.4             | 26.8                 | 37.0              | 10.2           | 199         | 67.0        |
| 728.962         | V    | 38.4                | -4.9             | 33.5                 | 37.0              | 3.5            | 210         | 51.7        |
| 991.270         | V    | 21.5                | -1.0             | 20.5                 | 37.0              | 16.5           | 400         | 315.6       |

- Configuration 2 : Standby

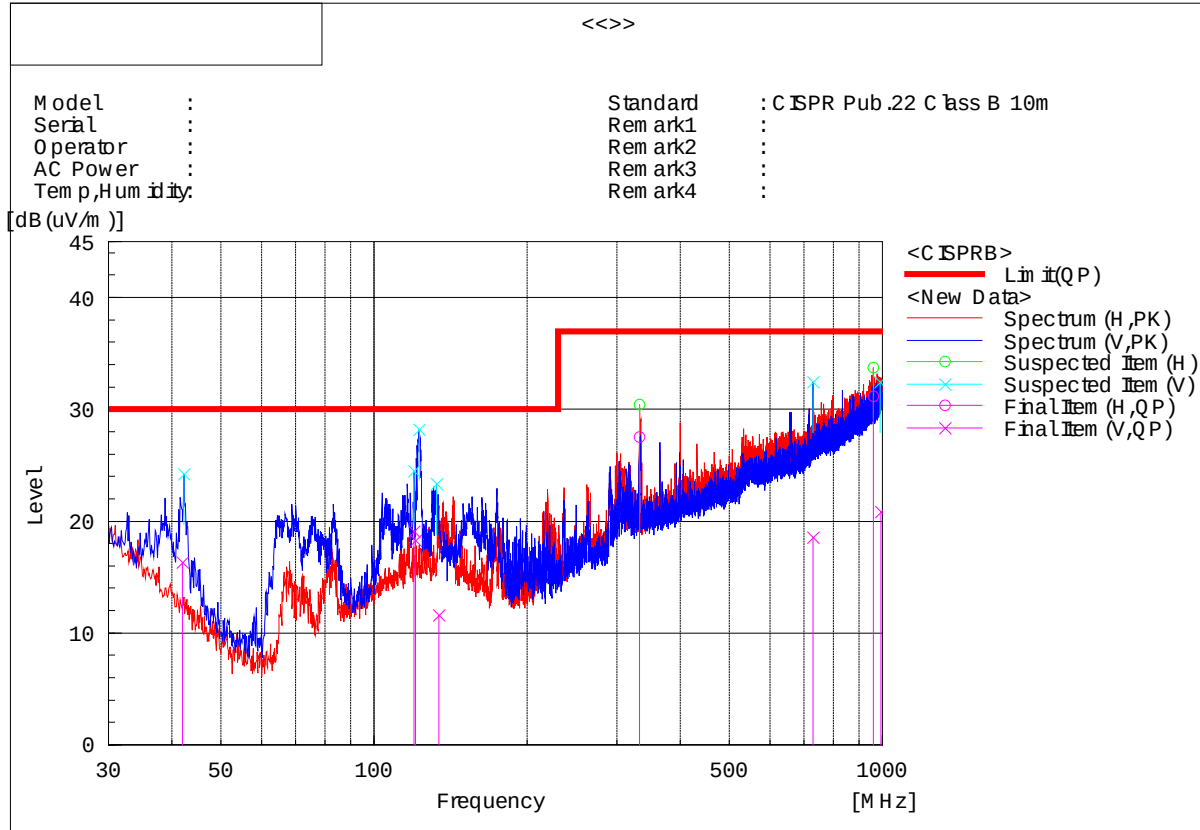
Test Graph and Results



| Frequency [MHz] | Pol. | Reading QP [dB(μV)] | Factor [dB(1/m)] | Level QP [dB(μV /m)] | Limit [dB(μV /m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|-----------------|------|---------------------|------------------|----------------------|-------------------|----------------|-------------|-------------|
| 42.125          | V    | 36.0                | -18.9            | 17.1                 | 30.0              | 12.9           | 100         | 284.8       |
| 166.164         | V    | 31.7                | -18.5            | 13.2                 | 30.0              | 16.8           | 100         | 7.0         |
| 219.635         | H    | 38.1                | -18.3            | 19.8                 | 30.0              | 10.2           | 400         | 109.3       |
| 222.909         | H    | 35.7                | -17.8            | 17.9                 | 30.0              | 12.1           | 301         | 63.7        |
| 334.338         | H    | 36.6                | -12.1            | 24.5                 | 37.0              | 12.5           | 201         | 337.6       |
| 657.833         | V    | 31.0                | -6.7             | 24.3                 | 37.0              | 12.7           | 297         | 70.7        |
| 972.112         | H    | 22.0                | 0.1              | 22.1                 | 37.0              | 14.9           | 302         | 277.2       |
| 992.482         | V    | 21.5                | -0.5             | 21.0                 | 37.0              | 16.0           | 299         | 177.8       |

- Configuration 2 : P2USB Printing

Test Graph and Results



Note) Receiving antenna polarization : Horizontal and/or Vertical

Test Distance : 10 m, Antenna Height : 1 m to 4 m

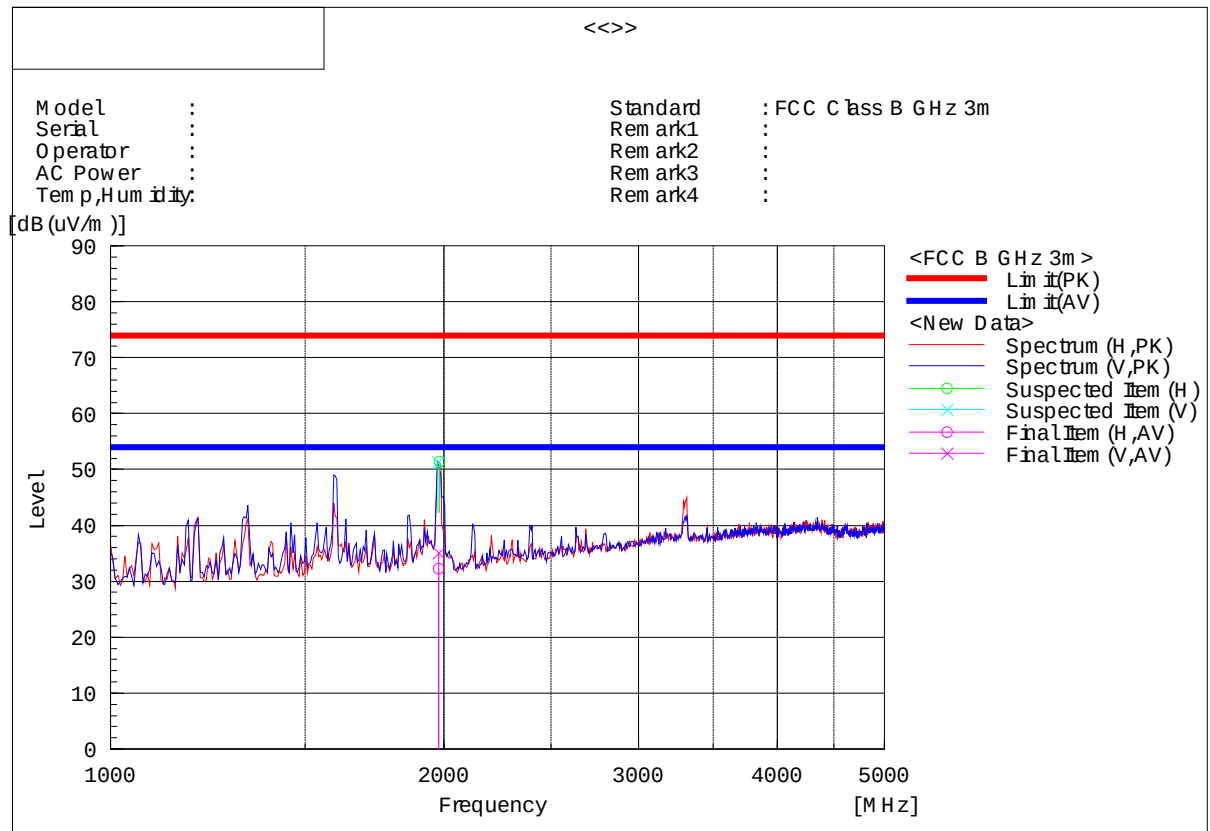
Level QP (Quasi-Peak) = Reading QP + Factor (Antenna Factor + Cable Loss - Amp. Gain)

Margin QP (Quasi-Peak) = Limit - Level QP

### 5.2.4.2 1 GHz to 5 GHz test results

- Configuration 1 : Standby

#### Test Results



#### Peak Measurement

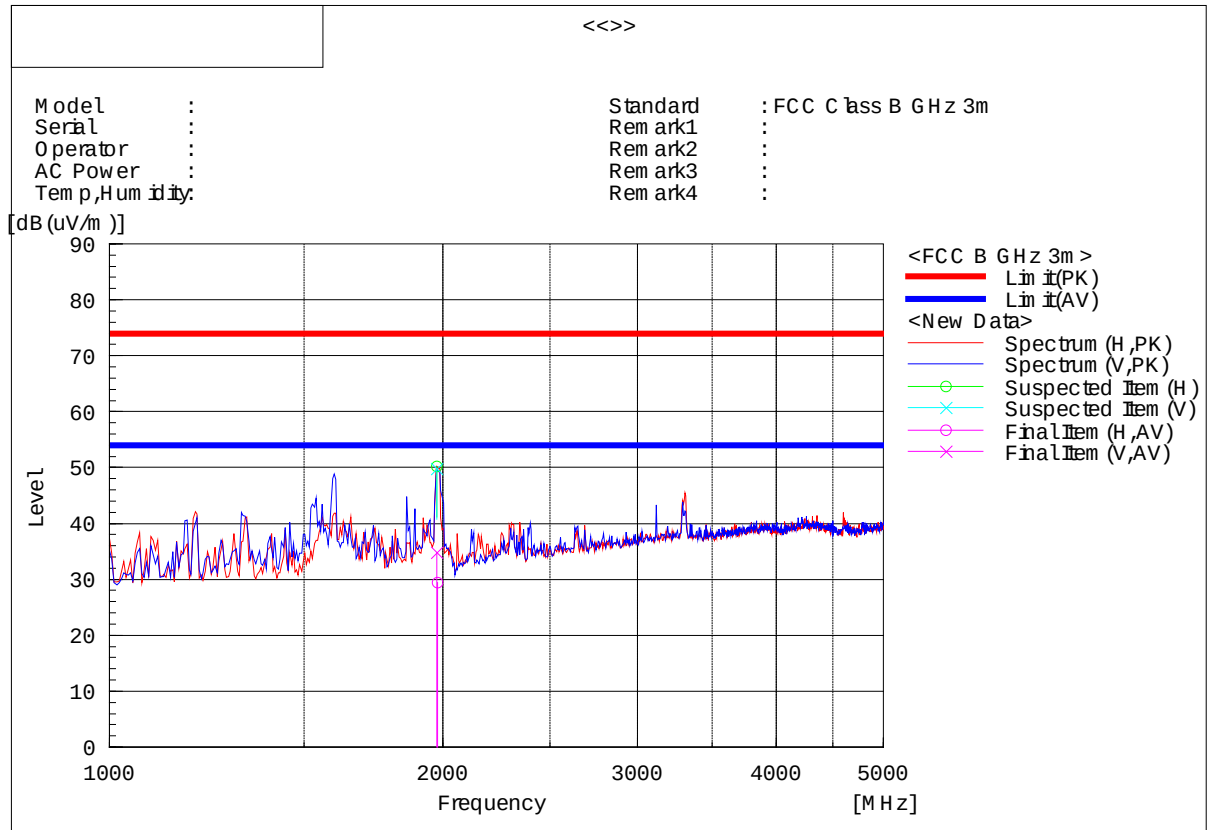
| Frequency [MHz] | POL | Reading PK [dB(uV)] | Factor [dB(1/m)] | Level PK [dB(uV/m)] | Limit [dB(uV/m)] | Margin PK [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1 976.954       | V   | 53.6                | -2.3             | 51.3                | 74.0             | 22.7           | 108         | 138.3       |
| 1 981.964       | H   | 53.5                | -2.1             | 51.4                | 74.0             | 22.6           | 108         | 129.7       |

#### Average Measurement

| Frequency [MHz] | POL | Reading AV [dB(uV)] | Factor [dB(1/m)] | Level AV [dB(uV/m)] | Limit [dB(uV/m)] | Margin AV [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1 978.081       | H   | 34.4                | -2.2             | 32.2                | 54.0             | 21.8           | 108         | 129.9       |
| 1 978.332       | V   | 37.3                | -2.2             | 35.1                | 54.0             | 18.9           | 108         | 137.9       |

## - Configuration 1 : P2USB Printing

## Test Results



## Peak Measurement

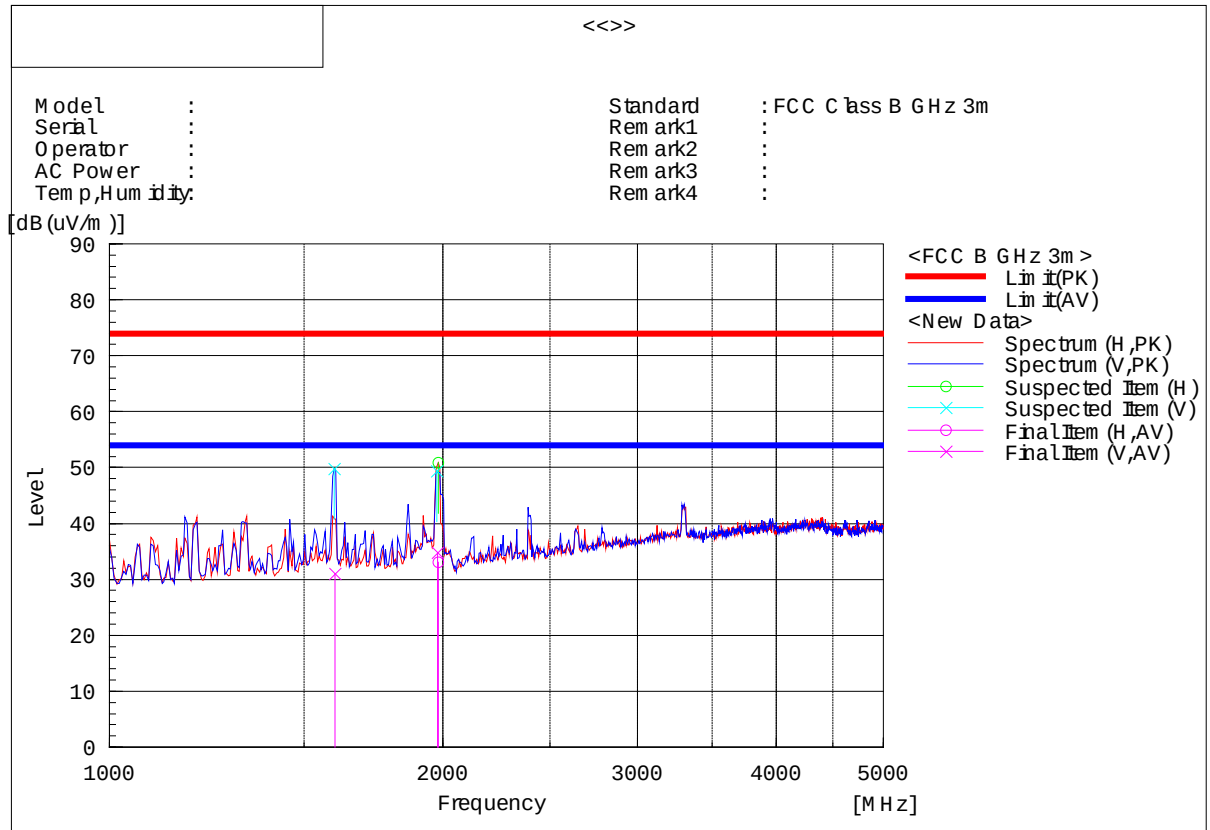
| Frequency [MHz] | POL | Reading PK [dB(uV)] | Factor [dB(1/m)] | Level PK [dB(uV/m)] | Limit [dB(uV/m)] | Margin PK [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1 976.954       | H   | 52.4                | -2.3             | 50.1                | 74.0             | 23.9           | 108         | 67.1        |
| 1 976.954       | V   | 52.1                | -2.3             | 49.8                | 74.0             | 24.2           | 108         | 127.2       |

## Average Measurement

| Frequency [MHz] | POL | Reading AV [dB(uV)] | Factor [dB(1/m)] | Level AV [dB(uV/m)] | Limit [dB(uV/m)] | Margin AV [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1 977.530       | H   | 31.6                | -2.2             | 29.4                | 54.0             | 24.6           | 108         | 67.3        |
| 1 976.979       | V   | 37.2                | -2.3             | 34.9                | 54.0             | 19.1           | 108         | 127.4       |

## - Configuration 2 : Standby

## Test Results



## Peak Measurement

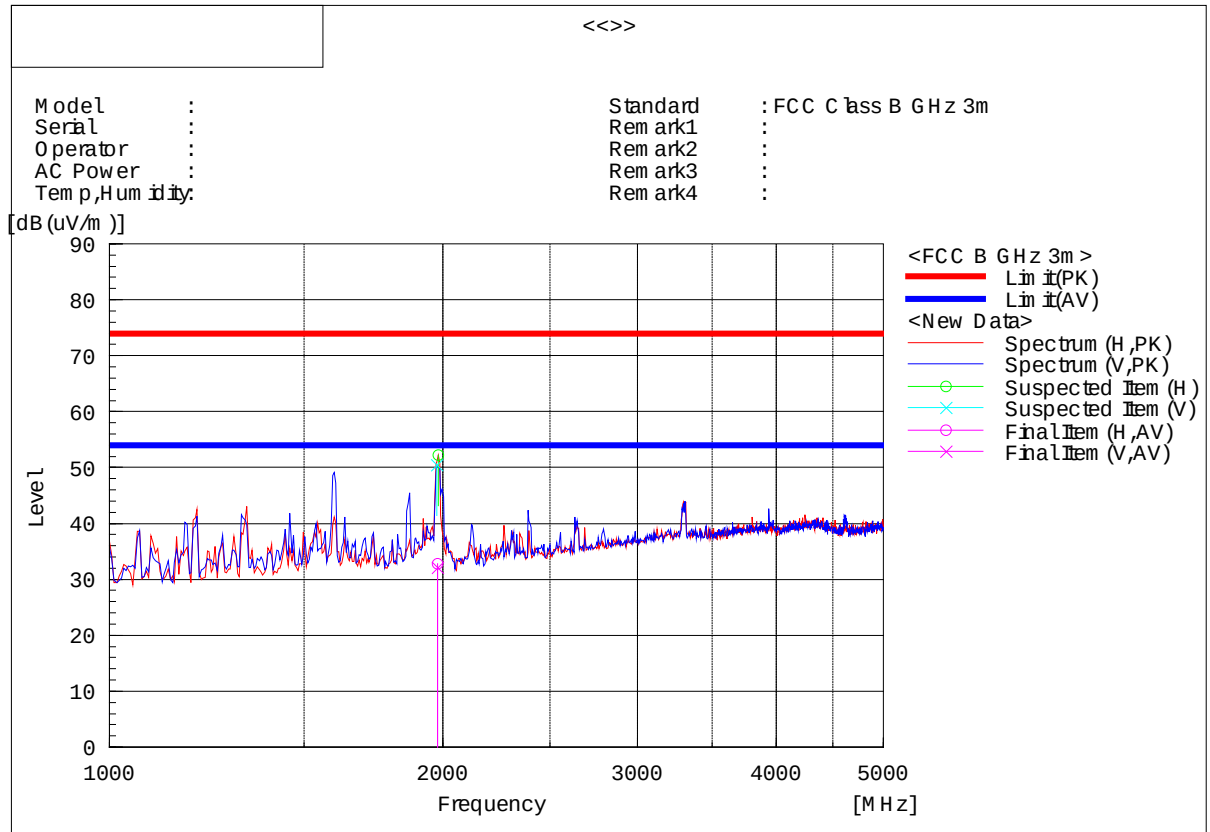
| Frequency [MHz] | POL | Reading PK [dB(uV)] | Factor [dB(1/m)] | Level PK [dB(uV/m)] | Limit [dB(uV/m)] | Margin PK [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1 596.192       | V   | 59.9                | -10.2            | 49.7                | 74.0             | 24.3           | 108         | 336.5       |
| 1 976.954       | V   | 51.7                | -2.3             | 49.4                | 74.0             | 24.6           | 108         | 129.9       |
| 1 981.964       | H   | 52.9                | -2.1             | 50.8                | 74.0             | 23.2           | 108         | 138.5       |

## Average Measurement

| Frequency [MHz] | POL | Reading AV [dB(uV)] | Factor [dB(1/m)] | Level AV [dB(uV/m)] | Limit [dB(uV/m)] | Margin AV [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1599.474        | V   | 41.3                | -10.2            | 31.1                | 54.0             | 22.9           | 108         | 339.3       |
| 1978.983        | V   | 37.0                | -2.2             | 34.8                | 54.0             | 19.2           | 108         | 129.9       |
| 1982.490        | H   | 35.1                | -2.1             | 33.0                | 54.0             | 21.0           | 108         | 138.6       |

## - Configuration 2 : P2USB Printing

## Test Results



## Peak Measurement

| Frequency [MHz] | POL | Reading PK [dB(uV)] | Factor [dB(1/m)] | Level PK [dB(uV/m)] | Limit [dB(uV/m)] | Margin PK [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1 981.964       | H   | 54.3                | -2.1             | 52.2                | 74.0             | 21.8           | 108         | 138.1       |
| 1 976.954       | V   | 52.8                | -2.3             | 50.5                | 74.0             | 23.5           | 108         | 86.6        |

## Average Measurement

| Frequency [MHz] | POL | Reading AV [dB(uV)] | Factor [dB(1/m)] | Level AV [dB(uV/m)] | Limit [dB(uV/m)] | Margin AV [dB] | Height [cm] | Angle [deg] |
|-----------------|-----|---------------------|------------------|---------------------|------------------|----------------|-------------|-------------|
| 1 978.733       | H   | 35                  | -2.2             | 32.8                | 54.0             | 21.2           | 108         | 138.6       |
| 1 978.482       | V   | 34.3                | -2.2             | 32.1                | 54.0             | 21.9           | 108         | 86.6        |

Note1) Receiving antenna polarization : Horizontal and Vertical

Level PK (Peak) = Reading PK (Peak) + Factor (Antenna Factor + Cable Loss - Amp. Gain)

Level AV (Average) = Reading AV (Average) + Factor (Antenna Factor + Cable Loss - Amp. Gain)

Margin PK (Peak) = Limit – Level PK (Peak)

Margin AV (Average) = Limit – Level AV (Average)

Note2) Remark: Radiated emissions

(Tx / Rx frequency and Harmonics) from the transceiver shall be ignored.

## Appendix – EUT photography



Front View



Rear View with label location



Inside View(Front)



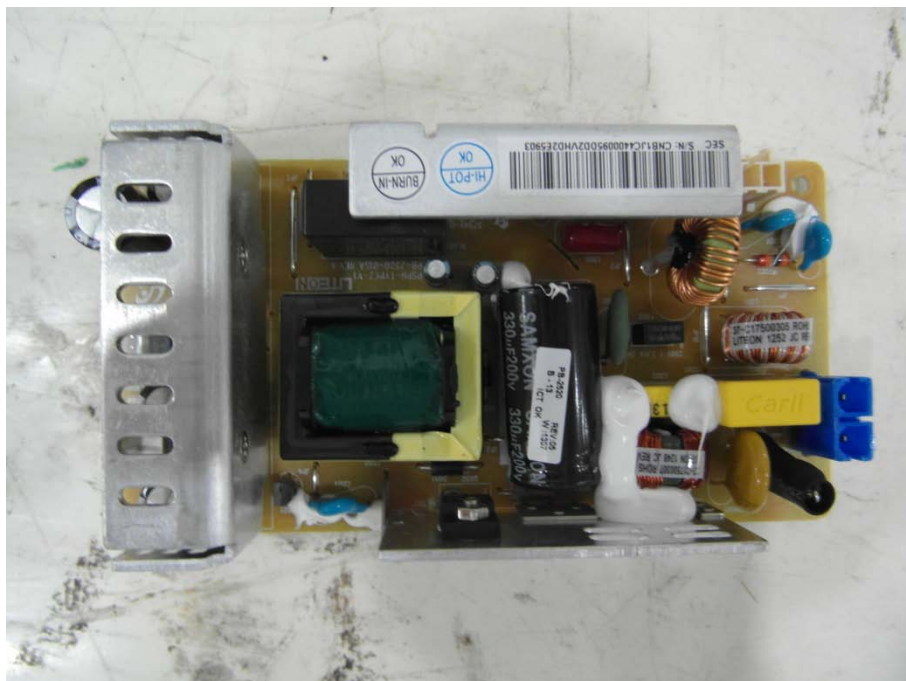
Inside View(Right)



Inside View(Rear)



Main SMPS View (DONG YANG E&P)



Main SMPS View (LITEON)

Project No. : LBE20133257



Mono Laser Printer : ProXpress M4020NX



Samsung Electronics Co., Ltd.  
Suwon, Korea, 443-742  
Place: M098

Model: ProXpress M4020NX

Volts: AC 110-127V

Hertz: 50/60Hz

Amps: 6.5A

Manufactured: FVJDKKBHJ 2011

FCC ID : A3LSLM4025NX

This device complies with part 15 of the FCC Rules.  
Operation is subject to the following two conditions:

- i) This device may not cause harmful interference, and
- ii) This device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus complies with  
Canadian ICES-003

Cet appareil numérique de la classe B est  
Conforme à la norme NMB-003 du Canada.

This product complies with 21 CFR Chapter 1, subchapter J.



3UU7

US E337632

I.T.E.

M/C:SL-M4020NX/XAA



Serial No.: FHBKBBNKJ001X

Made in China

Fabriqu  en Chine REV.00

Label